



器件制备及器件物理

基于金纳米棒可饱和吸收体的被动调Q掺铒光纤激光器

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摘要：利用种子诱导生长法制备了长径比为5的金纳米棒，测量了它的吸收谱，结果表明该纳米棒具有较宽的吸收带（800~1 600 nm）。进一步测量了它的非线性吸收性质，结果表明它在1.56 μm波长处具有可饱和吸收特性，有望被用于实现被动调Q脉冲激光的输出。将该可饱和吸收体置于掺铒光纤激光器腔内，当泵浦功率增至30 mW时开始有稳定的调Q脉冲激光输出，输出激光的工作波长为1.56 μm。当泵浦功率为205 mW时，可获得的最大输出功率约6.9 mW，脉冲能量达219 nJ。研究结果表明，这种新型可饱和吸收体在脉冲激光领域具有广阔的应用前景。

关键词：金纳米棒 非线性光学 光纤激光器 被动调Q

Passively Q-switched Er-doped Fiber Lasers by Using Gold Nanorods as Saturable Absorbers

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Abstract: The Au Nano-ropes (AuNRs) with aspect ratio of ~5 were synthesized through seed-mediated growth. We measured the absorption spectrum of the AuNRs and the AuNRs had a broad absorption band (800~1 600 nm). Furthermore, we measured the nonlinear absorption of the AuNRs and the result indicated that the AuNRs could be used to realize saturable absorption around 1.56 μm. Therefore, passively Q-switching could be achieved by using them. By inserting the AuNRs into the Er-doped fiber laser cavity, stable Q-switched pulses were achieved for a threshold pump power of 30 mW, and the emission wavelength was 1.56 μm. The highest output power of about 6.9 mW and the pulse energy as high as 219 nJ were obtained when the pump power was increased to 205 mW. Our results show the AuNRs are promising saturable absorber(SAs) for pulsed lasers.

Keywords: gold nanorods nonlinear optics fiber laser passively Q-switching

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